

CONTROLLING BURROWING RODENTS WITH BURROW FUMIGANTS

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Burrow fumigants are products that release toxic gasses when used in burrow systems.

They are effective tools for follow up of poison bait applications. Burrow fumigants can also be used as a primary control technique although cost of materials and labor generally restrict their use to small acreages or sparse populations.

The ignitable gas cartridge has been the traditional burrow fumigant for many years. They contain several combustible materials, primarily sodium nitrate, sulfur and charcoal. Toxic gasses, including nitrogen oxide, sulfur dioxide and carbon monoxide, are produced and oxygen is consumed as the cartridge burns.

The most commonly used gas cartridge in Montana is manufactured by the U.S. Department of Agriculture. When this product is used the ends of the 3.5 inch long by 1.5 inch diameter cartridge are punctured with a sharp nail or pick to allow the gasses to escape when the contents burn. The contents of the cartridge should be loosened with the pick if they seem compacted to assure complete combustion. A fuse is inserted in one end of the cartridge. When the fuse is lit push the cartridge as far down the burrow as possible. After allowing the cartridge to

ignite cover the burrow opening with soil. Cover any adjacent burrow opening from which smoke escapes.

Generally the gasses produced from a single cartridge are sufficient to fill a burrow system. Effectiveness can be reduced when a fumigant is used in a complex burrow system. Burrows with several openings and interconnecting tunnels or with turns, dips and rises can inhibit distribution of the gases. The shallow, complex nature of pocket gopher burrows often makes fumigants ineffective for controlling pocket gophers. Pocket gophers are also known to block off sections of their burrow into which a fumigant has been placed. Two cartridges may be more effective than one in some prairie dog burrows.

Gas cartridges burn with considerable heat and flame. Care should be taken when they are used in dry conditions to prevent accidental fires. Do not use under or near buildings. Cartridges can cause personal injury. Wear a glove at least on the hand handling the cartridge when lighting. Stay up wind when possible and avoid breathing the fumes. Gas cartridges absorb moisture readily so keep dry at all times. Store in a dry, low humidity area.

Although often considered an outdated control method, burrow fumigation using exhaust from an internal combustion engine can be effective when properly applied. It has an advantage over other burrow fumigants in that gases are actively and rapidly pushed through the burrow system. This is a particular advantage in the

extensive burrow systems of pocket gophers where passive fumigants may diffuse so slowly through the burrow that most of the gas escapes into the soil before acting on the gopher. To be effective, the motor used must have enough exhaust pressure to push the gas throughout the system. At least a 3-4 HP engine is needed. A hose attached to the exhaust pipe should be placed a short distance down the burrow, then sealed with soil. Time for fumigation will vary with the size of the burrow system. Several minutes per system is required.

In extensive systems such as pocket gophers construct, the effectiveness of the gas cartridge will be enhanced when exhaust gas is used to actively push the gas from the cartridge through the burrow. Because the gas cartridge produces a yellow smoke as it burns, the extent of the burrow can be seen by observing the smoke escaping from other burrow openings. This helps prevent retreatment of the same burrow system. With the proper equipment and organized application, this technique can be quite effective and useable on larger acreages.

Aluminum phosphide, better known as a grain fumigant, is registered as a burrow fumigant. Products are formulated in either tablet or pellet form. In the presence of moisture these products release hydrogen phosphide (phosphine) gas. Rate of gas release varies depending on amount of soil moisture present and soil temperature. Under average conditions gas release is slow occurring for as long as 24 hours.

Place 2-4 tablets or 10-20 pellets in each active burrow. Use fewer tablets in smaller burrows under moist conditions and more tablets in larger burrows and dry conditions.

Cover the burrow opening with soil after packing the opening with crumpled newspaper to prevent soil from covering the aluminum phosphide fumigant. A length of plastic pipe (1 2 - 1 3/4 in. dia.) can be used to place the tablets deep in the burrow systems.

Phosphine gas is highly toxic to humans. Use only outdoors and avoid fumes during use. Hold flask at arm's length and downwind. Phosphine readily absorbs through the skin, especially when the skin is damp. Cotton gloves should be worn during application and disposed of after use. Do not apply under occupied buildings or in burrows that may open under a building. Store in dry, ventilated areas. Do not expose to water or other liquid because this causes immediate release of gas. Do not apply during a rain.

Control of burrowing rodents will be enhanced if burrow fumigants are applied when soil moisture is high, such as early spring or after soil soaking rains or irrigation. This keeps the gasses within the burrow system rather than allowing them to permeate into the soil. The most important factors noted in poor control with aluminum phosphide are allowing soil to cover the tablets and failure to tightly seal the burrow opening after application.

Poor control with gas cartridges can occur if the burrow is closed before determining if the cartridge ignited. Some are duds, particularly if they have been stored in a moist environment.

A number of burrows in an area may be inactive. It is desirable to treat only active burrows but it can be difficult, even with experience, to distinguish between active and inactive systems. Inactive burrows can

sometimes be determined by the presence of spider webs across the burrow openings, partially collapsed openings and absence of recent digging activity. The number of burrows treated also can be reduced by closing burrow openings prior to treatment and only treating those burrows that have been reopened. In the case of pocket gophers, fumigant application should be made at fresh mounds.

Burrow fumigants are seldom completely effective and follow-up treatment of active burrows is usually required. Aluminum phosphide, gas cartridges and exhaust fumes have no residual effect. Therefore, treated burrows can be quickly reoccupied by animals moving from nearby areas.

Burrow fumigants are highly toxic to nontarget wildlife inhabiting rodent burrows. When there is concern about nontarget deaths burrows should be checked for signs of nontarget animals, and if any are present, those burrows should not be treated. The black-footed ferret, an endangered species, is known to occupy prairie dog burrows. Consult with wildlife biologists or Department of Agriculture specialist to ensure the black-footed ferret does not inhabit the area proposed for treatment.

The burrow fumigants discussed here have no secondary hazard to animals eating animal carcasses killed by fumigation.

Before using these or any other pesticide products carefully read and understand the pesticide label. When not in use store pesticides in locked storage. Always keep pesticides in their original, labeled container.

Burrow fumigants registered for use in Montana:

Gas Cartridges - General Use Pesticide

Aluminum Phosphide - Restricted Use

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